WHAT IS CLAIMED IS:

1. A sensor for detecting erosion of a wear surface of a component, the sensor comprising:

a conductive element embedded in the component, said conductive element comprising a first end positioned at a first distance from said wear surface;

a conductive loop comprising a wear portion positioned at a second distance from said wear surface proximate to said first end; and

a circuit coupled to said conductive loop for determining a continuity of said conductive loop.

2. The sensor of Claim 1, wherein a second end of said conductive element is attached to ground.

3. The sensor of Claim 1, wherein said conductive element first end is exposed on said wear surface.

4. The sensor of Claim 1, wherein said conductive element further comprises a resistance which is lower than a resistance of said conductive loop.

5. The sensor of Claim 1, wherein said conductive loop further comprises a pair of segments interconnected by said wear portion.

6. The sensor of Claim 5, wherein said conductive element first end is positioned between said pair of segments.

7. The sensor of Claim 5, wherein said pair of segments and said conductive element are substantially in parallel.

8. The sensor of Claim 1, wherein said conductive element comprises an insulated copper wire.

9. The sensor of Claim 1, wherein said conductive loop comprises an insulated copper wire.

10. The sensor of Claim 1, wherein said sensor further comprises a substrate and wherein said conductive element comprises a first conductive trace on said substrate and said conductive loop comprises a second conductive trace on said substrate.

11. A sensor for detecting erosion of a wear surface of a component, the sensor comprising:

at least one conductive trace on a substrate, said substrate attached to the component such that a wearing portion of said trace between a first trace end and a second trace end comes within a predetermined distance from the wear surface; and

a circuit for sensing when said first end is isolated from said second end.

12. The sensor of Claim 11, wherein the component comprises a second non-wear surface intersecting the wear surface, and wherein said substrate is fastened to the non-wear surface.

13. The sensor of Claim 12, further comprising an adhesive for fastening said substrate to the non-wear surface.

14. The sensor of Claim 11, wherein said substrate is a PCB.

15. The sensor of Claim 14, wherein said PCB is flexible.

16. The sensor of Claim 15, wherein said flexible PCB is rolled up.

17. The sensor of Claim 15, further comprising a rod for supporting said flexible PCB, and wherein said flexible PCB is wound around said rod.

18. The sensor of Claim 17, further comprising an adhesive bonding said flexible PCB to said rod.

19. The sensor of Claim 16, wherein said rolled up flexible PCB is retained in a cavity machined in the component.

20. The sensor of Claim 18, wherein said rolled up flexible PCB is retained in the cavity using a filler material.

21. The sensor of Claim 11, wherein said substrate is embedded in the component.

22. The sensor of Claim 21, wherein the component comprises a cavity machined therein and further comprising a filler material for retaining said substrate in the cavity.

23. The sensor of Claim 20 or 22, wherein said filler material is an epoxy.

24. The sensor of Claim 21, wherein said substrate is laminated into the component.

25. A sensor network for sensing uneven wear in a wear surface of a component, the network comprising:

a plurality of wear sensors distributed uniformly through out the component, each of said sensors comprising:

at least one signal relaying loop embedded in the lifter and comprising a wear portion positioned at a wear distance from the wear surface; and

a circuit for sensing a continuity of said at least one loop.

26. The sensor network of Claim 25, wherein said sensors are distributed uniformly through out the component.

27. The sensor network of Claim 25, wherein the wear surface is substantially flat and comprises a longitudinal axis, and wherein said sensors are distributed uniformly along said axis.

28. The sensor network of Claim 27, wherein successive ones of said sensors are positioned on opposite sides of the longitudinal axis.

29. The sensor network of Claim 25, wherein said at least one signal relaying loop is a copper wire and said circuit is sensitive to the flow of electricity in said wire.

30. The sensor network of Claim 25, wherein said at least one signal relaying loop is an optic fibre and said circuit is sensitive to the flow of light in said fibre.

31. A lifter for use in a liner of a grinding mill, the lifter comprising:
a wear surface; and
at least one wear sensor comprising:
at least one signal relaying loop embedded in the lifter and comprising a wear portion positioned at a wear distance from said wear surface; and
a circuit for sensing a continuity of said loop.

32. The lifter of Claim 31, further comprising at least one cavity machined in said wear surface and wherein each of said at least one loop is embedded in the lifter by retaining said loop in one of said cavity.

33. The lifter of Claim 32, wherein said at least one cavity is machined substantially at right angles to said wear surface.

34. The lifter of Claim 32, comprising a plurality of said at least one cavity distributed along a longitudinal axis of the lifter, and wherein successive ones of said cavities are positioned on opposite sides of said axis.

35. The lifter of Claim 32, wherein said loop is retained within said cavity by a filler material.

36. The lifter of Claim 35, wherein said filler material is an epoxy.

37. The lifter of Claim 31, wherein said loop is electrically conductive and said continuity sensing circuit is sensitive to a current flowing along said loop.

38. The lifter of Claim 37, wherein said loop comprises an insulated copper wire.

39. The lifter of Claim 37, wherein said loop comprises an electrically conductive trace on a PCB.

40. The lifter of Claim 39, wherein said PCB is flexible.

41. The lifter of Claim 40, wherein said flexible PCB is rolled up.

42. The lifter of Claim 41, wherein said rolled up flexible PCB is retained in a cavity in the component.

43. The lifter of Claim 42, wherein said rolled up flexible PCB is retained in the cavity using a filler material.

44. The lifter of Claim 31, wherein said substrate is embedded in the component.

45. The lifter of Claim 31, wherein the lifter comprises a cavity machined therein and further comprising a filler material for retaining said substrate in the cavity.

46. The lifter of Claim 43 or 45, wherein said filler material is an epoxy.

47. The lifter of Claim 31, wherein said loop comprises an optic fibre and said continuity sensing circuit is sensitive to light flowing along said optic fibre.

48. The lifter of Claim 37, wherein said sensor further comprises a conductive element embedded in the lifter comprising a first end positioned proximate to said wear portion.

49. The lifter of Claim 48, wherein a second end of said conductive element is attached to ground.

50. The lifter of Claim 48, wherein said conductive element first end is exposed on said wear surface.

51. The lifter of Claim 48, wherein said conductive element further comprises a resistance which is lower than a resistance of said conductive loop.

52. The lifter of Claim 48, wherein said conductive loop further comprises a pair of segments interconnected by said wear portion.

53. The lifter of Claim 52, wherein said conductive element first end is positioned between said pair of segments.

54. The lifter of Claim 52, wherein said pair of segments and said conductive element are substantially in parallel.

55. The lifter of Claim 31, comprising a plurality of conductive loops wherein said wear distance increases for successive ones of said loops.

56. A method for detecting erosion of a wear surface of a component, the method comprising the steps of:

providing at least one cavity in the component;

inserting a sensor comprised of at least one signal relaying loop in said at least one cavity such that a wear portion of said loop is positioned at a wear distance from the wear surface; and

during operation, sensing a continuity of said at least one loop.

57. The method of Claim 56, wherein said cavity is machined in the component substantially at right angles to the wear surface.

58. The method of Claim 56, comprising a plurality of said at least one cavity distributed through out the component.

59. The method of Claim 56, wherein said loop is retained within said cavity by a filler material.

60. The method of Claim 59, wherein said filler material is an epoxy.

61. The method of Claim 56, wherein said loop is electrically conductive and wherein said continuity sensing step comprises sensing a current flowing along said loop.

62. The method of Claim 61, wherein said loop comprises an insulated copper wire.

63. The method of Claim 61, wherein said loop comprises an electrically conductive trace on a PCB.

64. The method of Claim 63, wherein said PCB is flexible.

65. The method of Claim 64, wherein said sensor further comprises a rod and said PCB is wound around said rod.

66. The sensor of Claim 65, further comprising an adhesive bonding said flexible PCB to said rod.

67. The method of Claim 64, wherein said flexible PCB is rolled up.

68. The method of Claim 67, wherein said rolled up flexible PCB is retained in a cavity in the component.

69. The method of Claim 68, wherein said rolled up flexible PCB is retained in the cavity using a filler material.

70. The method of Claim 63, wherein said PCB is embedded said cavity.

71. The method of Claim 70, further comprising a filler material for retaining said PCB in said cavity.

72. The method of Claim 56, wherein said at least one loop comprises an optic fibre and said continuity sensing circuit is sensitive to light flowing along said optic fibre.

73. The method of Claim 61, wherein said sensor further comprises a conductive element embedded in the component comprising a first end positioned proximate to said wear portion.

74. The method of Claim 73, wherein a second end of said conductive element is attached to ground.

75. The method of Claim 73, wherein said conductive element first end is exposed on said wear surface.

76. The method of Claim 73, wherein said conductive element further comprises a resistance which is lower than a resistance of said conductive loop.

77. The method of Claim 73, wherein said conductive loop further comprises a pair of segments interconnected by said wear portion.

78. The method of Claim 77, wherein said conductive element first end is positioned between said pair of segments.

79. The method of Claim 77, wherein said pair of segments and said conductive element are substantially in parallel.

80. The method of Claim 56, comprising a plurality of conductive loops wherein said wear distance increases for successive ones of said loops.